

Boas (Fr.)

[Reprinted from SCIENCE, N. S., Vol. IV., No. 80, July 10, 1896.]



SCIENCE

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THE FORM OF THE HEAD AS INFLUENCED BY GROWTH.

TO THE EDITOR OF SCIENCE: I was much interested in Dr. W. Z. Ripley's contribution on the question of the growth of the head which appeared in the issue of June 19th, of SCIENCE. The author's observation that the cephalic index of Americans decreases with increasing age is certainly correct, but I think the contrary observations of European investigators admit of an interpretation different from the one given by Dr. Ripley, who is inclined to believe that in long-headed races the index decreases with increasing age, while in short-headed races it increases with increasing age. The European material seems to me hardly adequate to form a far-reaching conclusion of this kind.

Zuckerkandl based his conclusions that children have more elongated heads than adults on measurements of 156 children and 197 adults from the interior parts of Austria. But in selecting these individuals he excluded what he calls the Slavic type, including only the elongated heads which he ascribes to the Teutonic type. This arbitrary selection makes the results of his comparison of doubtful value for a treatment of the question of growth; Zuckerkandl discusses this point at length and points out that his statistics must not be considered final. (*Mitt. der Anthropol. Ges. in Wien* XIV. 1884, p. 127.)

Holl has based his statement on the measure-

ment of only 16 skulls of children, and consequently no weight can be attached to it.

Mies to whom Dr. Ripley refers does not make—so far as I can make out—any statement in regard to the question at issue in the passage quoted (*ibid.* XX. 1890, p. 39 ff.).

The statistics of Dr. Livi which were published in the *Archivio per l'antropologia e la etnologia*, 1886, p. 235, are based on observations by Calori, Brennsohn, Waldhauer, Wæber and Broca; but they are classified in two groups: of more and of less than 33 years of age, and can therefore not be utilized for treating the question of the influence of growth upon the form of the head, as they are rather directed to detecting retrogressive changes which begin after the 35th year of life.

While these European data are open to serious objections, we find in America that with few exceptions long-headed tribes as well as short-headed ones, show a decrease in the value of the cephalic index with increasing age. I have compiled the following table in order to make this point clear:

CEPHALIC INDEX OF			
Tribe.	Adults.	Children.	Difference.
Micmac.....	79.0 (136)	80.9 (84)	+ 1.9
Eastern			
Ojibwa...	81.8 (396)	81.6 (309)	— 0.2
Cherokee...	82.0 (140)	81.0 (75)	— 1.0
British Co-			
lumbia....	83.6 (284)	85.3 (138)	+ 1.7
Moqui	84.0 (116)	86.4 (77)	+ 2.4
Navajo.....	84.2 (77)	86.8 (76)	+ 2.6

The cause for this decrease is not far to seek. With maturity the frontal sinuses and the occipital protuberance begin to grow, particularly in males, while there is no corresponding local growth on the parietal or temporal bones. This has the effect that the length grows more rapidly than the breadth and that the index begins to decrease. The lesser development of the frontal sinuses and of the occipital protuberance in women is also a sufficient explanation for their greater brachycephalism.

Nevertheless, I believe that the breadth of the head increases as long as the length, although at a slower rate, and that Dr. Ripley would have obtained this result if his series had been more extensive. I cannot find that Schaafhausen, who held this opinion, has substantiated it by any extensive series of observations. The best series that is available is that of Dr. Venn (*Jour. Anthropol. Institute*. XVIII., p. 152, ff.) which when arranged from this point of view gives the following results:

Year.	Length of Head. Inches.	Breadth of Head. Inches.	Index.	Individuals.
19	7.54	5.87	77.9	139
20	7.57	5.93	78.3	305
21	7.58	5.93	78.2	248
22	7.63	5.98	78.4	189
23	7.54	5.97	79.2	83
24	7.71	6.03	78.2	52
+25	7.62	6.00	78.7	79

But the growth of the head does not close with the twenty-fifth year. The following table shows that among the Indians it continues to grow until near the thirtieth year, and the period will certainly not be found shorter among people of European descent, while it may be shorter among the negroes:

Years.	Length of Head
20-21.....	193.0 mm.
22-23.....	193.7 "
24-25.....	193.8 "
26-27.....	194.3 "
28-29.....	194.8 "
30 and more.....	194.8 "

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